

WHAT IS CLAIMED IS:

1. Apparatus for separating components of a slurry, the apparatus comprising:
a hydrocyclone for receiving a slurry comprising liquid and solid
5 components, the hydrocyclone having a slurry inlet, an underflow outlet,
an overflow outlet and an inner wall having a circular cross sectional
shape;
a products vessel configured to receive a portion of the liquid components
and gases from the overflow outlet; and
10 means for providing fluid communication between the products vessel and
the underflow outlet.
2. The apparatus of claim 1, wherein the means for providing fluid communication
comprises a housing enclosing the hydrocyclone and the products vessel, and
15 wherein the products vessel and the underflow outlet are open to the interior of
the housing.
3. The apparatus of claim 2, further comprising means for adjusting pressure
within the interior of the housing.
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4. The apparatus of claim 1, further comprising a conduit between the overflow
outlet and the products vessel.
5. The apparatus of claim 1, further comprising a solids vessel configured to
25 receive a solids-enriched slurry from the underflow outlet.
6. The apparatus of claim 5, further comprising a conduit between the underflow
outlet and the solids vessel.
- 30 7. The apparatus of claim 5, wherein the means for providing fluid communication
comprises a gas circulation conduit between the products vessel and the solids
vessel.
8. The apparatus of claim 5, further comprising means for adjusting pressure
35 within the solids vessel.
9. The apparatus of claim 1, wherein the underflow outlet comprises an adjustable
opening.

10. The apparatus of claim 1, wherein the slurry inlet is connected to a reactor for receiving a slurry from the reactor.
- 5 11. The apparatus of claim 1, wherein the slurry inlet is connected to a degassing unit for receiving a degassed slurry from the degassing unit.
12. The apparatus of claim 1, wherein the slurry inlet is connected to a pump for receiving a slurry having an elevated volumetric flow rate.
- 10 13. Method for separating components of a slurry, the method comprising:
introducing a slurry comprising liquid and solid components into a hydrocyclone, the hydrocyclone having an underflow outlet and an overflow outlet;
15 directing separated liquid components and gases through the overflow outlet and into a products vessel; and
providing fluid communication between the products vessel and the underflow outlet.
- 20 14. The method of claim 13, further comprising the step of operating the hydrocyclone in balanced mode.
- 15 15. The method of claim 14, wherein the hydrocyclone is operated in balanced mode by adjusting the size of the underflow outlet, adjusting the volumetric flow rate at which slurry is introduced into the hydrocyclone, or a combination thereof.
- 25 16. The method of claim 13, wherein fluid communication between the products vessel and underflow outlet is provided by enclosing the hydrocyclone and products vessel in a common housing.
- 30 17. The method of claim 16, further comprising the step of operating the hydrocyclone in balanced mode.
- 35 18. The method of claim 16, further comprising the step of adjusting pressure within the housing.

19. The method of claim 18, wherein the slurry introduced into the hydrocyclone is at an elevated pressure and the pressure within the housing is adjusted to about the elevated pressure.
- 5 20. The method of claim 13, further comprising the step of directing a solids-enriched slurry through the underflow outlet and into a solids vessel.
21. The method of claim 20, further comprising the step operating the hydrocyclone in balanced mode.
- 10 22. The method of claim 20, wherein the step of providing fluid communication between the products vessel and the underflow outlet is achieved by providing fluid communication between the products vessel and the solids vessel.
- 15 23. The method of claim 20, further comprising the step of adjusting pressure within the solids vessel.
24. The method of claim 23, wherein the slurry introduced into the hydrocyclone is at an elevated pressure and the pressure within the solids vessel is adjusted to about the elevated pressure.
- 20 25. The method of claim 13, wherein the slurry is at an elevated pressure, temperature or a combination thereof.
- 25 26. The method of claim 25, wherein the slurry is at a pressure of at least about 250 psig.
27. The method of claim 25, wherein the slurry is at a temperature between about 250° F and about 600° F.
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